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GRAIN SUBTERMINAL STUDY

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October 28, 1981

Fellow Montanans:

The following report on Grain Subterminal Feasibility for the State of Montana has been prepared by Roger Creighton Associates, Inc. (RCAI). RCAI is a consulting firm with considerable past experience in railroad planning, costing, and feasibility studies.

In this study effort, RCAI was charged with evaluating the economic and institutional feasibility of applying a grain subterminal and unit train grain transportation concept to Montana's complex transportation structure.

The findings, conclusions, and recommendations of this report do not reflect state government policy or position on grain subterminal development in the state. They are simply the independent, professional assessments of one consulting firm. These findings will, however, provide valuable background as we press forward in formulating state economic and transportation policy.

We would appreciate hearing from you as to any comments or suggestions you may have. Please feel free to call us at 449-3494 or 449-3423.

Gary Buchanan, Director
Montana Department of Commerce

William Fogarty
William J. Fogarty, Admn.
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WJF/jl

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SUMMARY REPORT

BULK FREIGHT GRAIN
TRANSPORTATION
SYSTEM STUDY

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August 19, 1981

SUMMARY REPORT

Background of the Study

The "Bulk Freight Grain Transportation System Study", or Grain Subterminal Study, is an outgrowth of the initial Montana Rail Plan, which found that major investment in rehabilitating 1920's era light density rail lines by itself would do little to solve the car supply, service, and rate problems affecting the use of the rail system for the transport of wheat and barley. It was reasoned that a better solution would be to modernize the entire grain collection and marketing system to lower transport and handling costs (which are ultimately paid for by the grower) thus placing Montana in a stronger competitive position vis-a-vis the other principal wheat-producing states.

Montana's principal markets for wheat and barley have traditionally been the west coast and the upper midwest. In recent years, a majority of the wheat has moved west through the Seattle, WA or Portland, OR gateways to export markets.1/ On the other hand, virtually all of the barley is shipped to domestic markets, primarily maltsters or feed lots. Over the years, the proportion of the grain traffic handled by the railroads and motor carriers has varied, depending to a large extent upon the rail rates relative to truck rates and also on the backhaul possibilities for trucks. The proportion of wheat hauled by rail consequently has varied between roughly 60 and 90 percent of total grain movements. During the 1970's, modal shares were affected by such changes as: (1) the lowering of single car rail rates in

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1/ In the last year, further specialization has occurred whereby virtually all wheat now moves through Portland or other nearby Columbia River ports, whereas Seattle has focused on feed grains.

August 1976 and more recently in December, 1980, (2) waterways improvements to the Snake and Clearwater Rivers and the construction of river terminals at Lewiston, ID permitting grain transport by barge starting in February 1975, and (3) variability in the availability of rail cars and in the reliability of rail service (transit times). During this period, the railroads have sought to maximize their profits on hauling Montana grain, an objective different from seeking to dominate in the physical handling of grain. Railroads do, however, monitor the effects of truck competition; when the rail share of the market has dropped to roughly 50-60 percent, the BN has in the past countered by reducing single car rates to recapture a portion of the traffic being lost to motor carriers. Usually this reduction has meant eliminating some of the privileges or enroute services heretofore performed or by adding assessorial charges to recapture the costs of ancillary services.

Although volume rates for agricultural products have been in existence for some time in states enjoying strong intramodal competition, until recently the BN has not expressed much interest in implementing such rates in Montana.1/ Thus, BN's decision to introduce volume rates on 26 and 52 car units effective December 1, 1980 (and at the same time reduce single car rates) reflected a major change in corporate policy and came about more quickly than State officials had anticipated. BN's intent in offering multi-car rates (26-cars from one or two to four origins) was to provide a transition between single car and unit train service, the latter being limited to 52 cars for

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1/ For example, volume rates have been offered by the BN and the UP on export corn and wheat originating in Nebraska and moving west for some time. Typically, the UP has been the leader in offering volume rates with the BN being forced to reciprocate in order to maintain its market share.

braking reasons over the Rockies.[1] The BN recognized that Montana country elevators simply did not then have the capability of loading out unit trains, and that interim multi-car rates were necessary in order to provide the incentives needed to construct subterminals or to expand the load-out capabilities of existing elevators. Thus, BN introduction of volume rates represented a pricing strategy which over time was expected to (1) force greater centralization of grain collection and marketing, (2) reduce truck competition, and (3) increase the profitability of grain traffic through the greater cost efficiencies of unit trains (versus single car service). In short, it forces changes which, if they had been advocated solely by State government, would not have been implemented for a long time.

Anticipated Impacts

Present indications are that volume rates will indeed unleash a wave of capital investments to expand the capabilities of the larger existing grain public warehouses by extending side tracks and improving loadout capabilities to take advantage of the 26-car rate offered by the BN. With several exceptions, these rates have not yet resulted in private enterprise decisions to construct subterminals *per se*, although this may be the consequence of high interest rates rather than explicit decisions against implementing subterminals. Ultimately, full unit train rates are expected to provide the financial incentives for one or more of major grain companies to invest in strategically-located subterminals.[2]

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[1] Originally, the 26-car rate from two to five origins was set to expire at the end of 1981, although the BN has since extended the rate for an additional year.

[2] Since the major grain companies ultimately handle the grain produced in Montana, they would tend to enter the collection and marketing end of the business only if the overall profitability of subterminals by themselves was great enough and by so doing they could achieve an advantage over competitors. Grain companies generally seek to avoid destructive head-to-head competition, however.

Implementation of such facilities would force others (independents or cooperatives) to consider similar facilities simply to survive, provided that they can secure the necessary funding.[1] Initial improvements to existing public warehouses will intensify price competition among country elevators, which will result in increased attrition of the smaller elevators (or those not capable of being expanded to take advantage of the 26-car rate). The grower may, over the short-run, benefit from such competition in the form of a higher price for his product. Ultimately, subterminals capable of efficiently handling 52-car trains will supersede many of the lesser facilities, resulting in further concentration of grain collection and marketing activities and an erosion of marketing alternatives for the grower.

While it appears that a substantial number of existing elevators in the Golden Triangle and Northeastern Montana will be converted to handle 26 cars, these facilities will not be true grain subterminals.[2] The chief motivation in expanding existing facilities is one of remaining in the grain marketing business, or at least retaining one's traditional market share. Overbuilding is inevitable as firms seek to dominate their competitors. Many of those grain public warehouses incapable of being expanded would eventually be forced out of business. Outside of the Golden Triangle and the Northeast, grain public warehouses would continue, but at a growing disadvantage as the spread between single car and volume rates widens.

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[1] Cooperatives generally do not have the same assets and credit rating that the major grain companies have. State officials have received indications that local banks are rather hesitant in lending money for track and elevator improvements to take advantage of the 26-car rate.

[2] The tendency will be to adapt existing facilities to meet momentary railroad-imposed tariff conditions rather than to start from scratch and develop the automatic weighing, conveying, storage, inspection, blending, and loadout capabilities required for true subterminal capability. Unless the latter is done, there will be no change in functions performed (i.e., no shifting of present terminal elevator functions back to the hinterlands). Existing facilities would simply become expanded "pumphouses".

Overview of the Study

The grain subterminal study focused on determining the economic feasibility of the grain subterminal concept as applied to Montana. Feasibility depends upon whether proposed subterminals generate sufficient economic benefits for grain growers and elevator operators to overcome the inherent fear and distrust of a major change in the collection and marketing of grain. If proven feasible, future steps would then include determining the organizational and institutional mechanisms for implementing grain subterminals.

The term "feasibility" means different things to the parties involved. Feasibility to grain growers means a higher price for export wheat, which is achievable only through a reduction in transport charges, since the major grain markets essentially determine delivered price. Feasibility to public warehouses means lower overall transport charges. In other words, the reduction in rail rates (unit train versus single car) must more than offset the annualized cost of converting an existing elevator to be capable of handling multiple carloads, or the costs associated with marketing through a subterminal, which includes (1) transporting grain by motor carrier from the public warehouse to the subterminal and (2) associated handling and storage charges at the subterminal. Feasibility to railroads means greater profitability over that presently enjoyed. This means that the reduction in carload revenues must be more than offset by the sum of: (1) increased traffic, (2) operating cost savings stemming from the use of unit trains in lieu of conventional service, (3) cutbacks in the frequency of local way freights presently serving public warehouses, thus further reducing operating costs, (4) greater equipment utilization, thus reducing the size and cost of the car fleet needed to move Montana grain, and (5) reductions in infrastructure costs through abandonment of branchlines no longer needed with the implementation of subterminals.

Given the above objective, the study focused on three main alternatives which were (1) continuing the single car service that existed prior to December 1, 1980, (2) adding subterminals, but keeping public warehouses as local collection and marketing points, and (3) adding subterminals by phasing out present public warehouses. Subterminals would concentrate on export wheat; remaining public warehouses would continue to handle barley and wheat not moving west.[1/] With the introduction of volume rates, the first alternative is not a viable course of action, but merely serves as a reference point against which to quantify potential changes brought about by subterminals.[2/] Although not examined in great detail, a fourth alternative involving improvements to 40-50 existing grain public warehouses to be able to handle 26 car units is also possible. This, in effect, is a half-way solution which appears to be popular primarily because it causes less severe change to the grain collection system.

[1/] The study has assumed that subterminals will specialize in volume shipments of wheat moving west and not take on carload shipments of barley and wheat (e.g., duram destined to other markets, although this could be readily handled by subterminals. Redundant public warehouses may choose to change functions, such as becoming feed and seed outlets. Still others will probably be sold to growers for use as private storage, a trend which is already happening. If several cooperatives join together in building a subterminal, present public warehouses could conceivably become storage adjuncts to the subterminal. The above changes will probably occur gradually over a five to ten-year period.

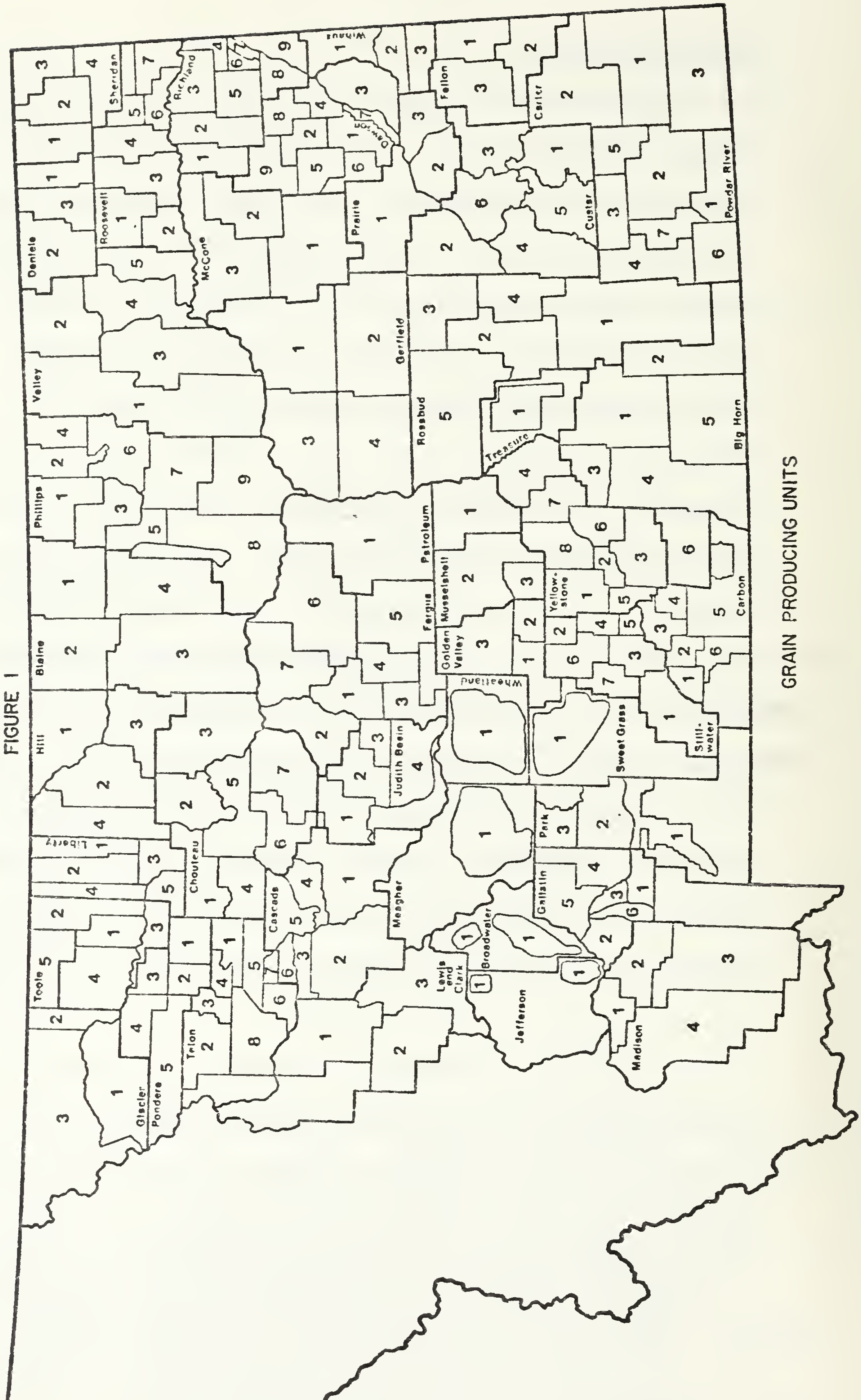
[2/] 1979 grain transport data were used to represent the base year, adjusted to reflect December 1980 transport rates and costs. These data reflect the modal shares which existed prior to the introduction of volume rates.

Study Methodology

The quantitative procedures used in this study were simple and straightforward. They made use of the rather detailed information available on producing unit production, public warehouse throughputs, and domestic and export markets for wheat.1/ The methodology was based on the principle that the grower will choose the least cost transport so as to maximize the income received. For each commodity movement or "flow", the procedure involved systematically comparing costs and revenues associated with two (or more) routings between points of commonality (i.e., the producers at the origin end and the markets or market gateways at the destination end). The first routing, the null situation or base case, consisted of small volume flows moving from producing units to public warehouses to markets by up to five mode/destination combinations involving either truck or single car rail transport. The second routing, the proposed subterminal alternative(s), consisted of truck movements to subterminals (either direct from producing units or via public warehouses) followed by volume shipments from subterminals to markets using unit trains. The second routing never totally displaces the first, since there will always be some residual traffic which will continue to move by truck and single car rail. At each stage, information on the cost of providing the transport service and revenues derived therefrom by the transport company (charges or rates to the purchasers of the transport service) was developed and accumulated.

1/ Grain production information was supplied by the Montana Office of the USDA Agriculture Stabilization & Conservation Service. Elevator throughputs were obtained from grain transport data maintained by the Montana Department of Agriculture. Carloading information was supplied by the BN and the Milwaukee. Mode/mode combinations included rail and truck to Pacific Northcoast ports and interior Oregon/Washington stations and truck/barge through Lewiston, ID and other Snake/Columbia River ports.

FIGURE 1



GRAIN PRODUCING UNITS

Much of the technical effort was spent in objectively determining costs, charges and revenues to affected parties for transporting and handling grain.[1] Participants include the grain growers, elevator operators (public warehouses and subterminals), and transporters (railroads, motor carriers, barge lines, and farm trucks).[2] Single car and unit train rail service were treated as two different services as were motor carrier line haul and collector services. Motor carrier line haul transport refers to public warehouse to market or river terminal grain movements and includes an allowance for backhaul movements of other commodities. Collector services consist of a combination of public warehouse to subterminal and grain-producing unit to subterminal movements (the latter is limited to one-way trip lengths over 35 miles, which represents the economic "breakpoint" between farm and grain truck costs) and assume on an empty backhaul.

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[1] Costs refer to manpower, fuel, and other expenditures incurred in providing transport or handling services. Revenues are the income received by transporters and elevator operators in return for services. Profits represent the difference between revenues and costs. Revenues are identical to charges, which are levied against the purchaser of the transport or handling service. In a few cases (e.g., farm trucks, barge operations, motor carriers providing collector services), transport revenues have been set equal to costs.

[2] The costs incurred and revenues earned for river terminals (motor carrier and barge interface) has been included in the costs and revenues developed for barge operations.

The procedure utilized was not intended to be a model for determining the optimum location for subterminals. However, as part of the accounting process to determine economic feasibility, it became necessary to conceptualize on the possible number and approximate location of subterminals needed to serve Montana growers. In hypothesizing locations, factors considered included (1) coverage of the state, (2) minimizing the distance between grain-producing units and the nearest subterminal, (3) rail rate structures --especially points where sizable differentials occur, and (4) minimizing the total number of subterminals to keep handling and storage charges as low as possible. Recognizing that a good location from a regional perspective could be moot if a satisfactory site was not available, a brief inspection was made of some 56 different sites to ensure the availability of at least one good site for a subterminal within its tributary area. Site factors considered included size and terrain, ownership, rail service, highway access, and the availability of utilities. In the end, ten locations were selected as part of the process for determining the feasibility of subterminals in Montana. Once selected, each grain-producing unit was then assigned to a subterminal based on highway routes/distances and long-standing patterns of local/regional commerce (see Figure 2).

Some further hypothesizing of the characteristics and operations of subterminals was also required. Recognizing the vast amount of on-farm storage existing in Montana and recent trends for using former public warehouses as private storage, the storage capacity of proposed subterminals was set at 500,000 bushels.[1/] Subterminal land acquisition,

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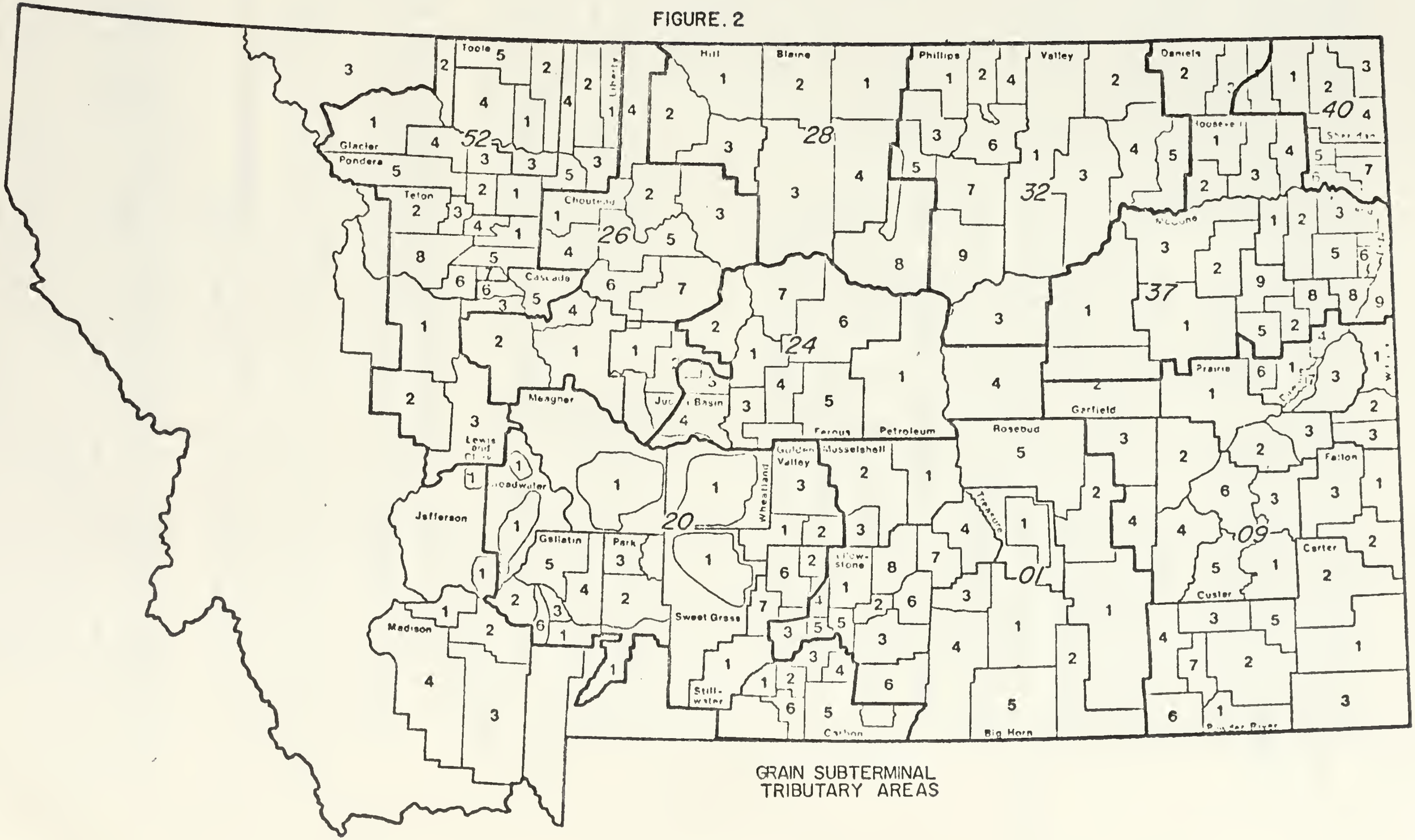
[1/] This was increased to one million bushels for four high-throughput subterminals in Alternative 3 (where existing public warehouses are phased out). It was felt that additional storage was necessary to ensure adequate supplies of grain to meet contractual commitments during extended periods of adverse weather.

FIGURE. 2



GRAIN SUBTERMINAL TRIBUTARY AREAS

site preparation, trackage and construction costs were estimated to be $3.3 and $4.2 million for 500 thousand and one million bushel facilities, respectively.[1] Subterminals would have the capability of unloading all types of vehicles; however, under Alternative 2 (subterminals supplement public warehouses), delivery would continue to be by farm truck to public warehouses and under Alternative 3 (subterminals replace public warehouses), farm trucks would deliver directly to subterminals if the grain-producing unit was located 35 miles (one-way) or less from the subterminal. Subterminals would arrange for contract trucking to move the grain from public warehouses to the subterminal (Alternative 2) and from grain producing units located more than 35 miles from the subterminal (Alternative 3).[2] The handling/storage charge scenario initially contemplated was a 10.5 cents per bushel handling charge and 0.1 cents per bushel per day storage charge. This scenario resulted in the higher volume facilities subsidizing the lower volume facilities. Consequently, an additional scenario consisting of a variable handling charge and the 0.1 cents per bushel per day storage charge was tested under the proviso that each subterminal had to earn a ten percent profit.

In 1979, public warehouses handled approximately 109.9 million bushels of westbound wheat of which 88.7 million bushels was considered potentially capturable by subterminals and unit trains. These figures

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1/ Cost estimates utilize information supplied in part by Jacobson and Sons Construction Co., Inc. Bismarck, ND.

2/ Obviously, there is no present requirement that subterminals offer such a service. However, a collection service makes a lot of sense in neutralizing the economic disadvantages of growers not located in general proximity to subterminals as well as utilizing a mode which is more cost efficient than farm trucks (at longer distances). Acceptance of subterminals will be significantly improved if the costs of local transport can be equitably spread across all growers. An allowance or discount system based on distance from the subterminal represents another possibility.

for grain flows represent wheat moving through public warehouses, with no allowance being made to account for track buying or other movements for which information was not available. They were intended to be deliberately conservative.

Considerable variation existed in the grain potential of each of the ten subterminal tributary areas, with three subterminals handling more than 10 million bushels and one more than 20 million bushels annually.[1/] Consequently, it was concluded that four of the subterminal tributary areas could probably support multiple subterminals, provided that competing subterminals were not at the same location. It was found that the additional operating and infrastructure costs from maintaining competing facilities was largely offset by reduced grain assembly (transport) costs.

Study Results

The overall results of the grain subterminal study substantiate what Montana officials had privately suspected for some time -- that subterminals were feasible as a replacement for, but not as a supplement to, existing public warehouses. The results also indicate that grain subterminals produce far greater benefits than lesser investment in expanding the capabilities of existing elevators to handle 26-car units.

The overall costs and revenues of a subterminal plan by themselves are of little consequence; what is important is the relative and absolute

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[1/] After allowance for a limited amount of continued single car rail traffic and continued trucking to the west coast for spot movements and backhauls.

change from present conditions. This requires the use of a base case. The introduction of volume rates and reduction in single car rates adds a major complication, as comparisons made with conditions which no longer exist are not very meaningful. Three possibilities exist: (1) using the 1979 grain flow data and the then existing rate structures, (2) updating the preceding to reflect the new rail rates (and costs), and (3) using the preceding, but modifying the results to reflect the diversion from truck to rail occurring solely as a consequence of the lower single car rates. The first represents a bygone situation. The second reflects the situation as of December 1, 1980. The third is obviously the most satisfactory base, provided that the diversion from truck to rail can be measured or approximated. However, given the timing of this study, grain transport data indicating the diversion taking place as a consequence of the rate reductions simply were not available. Thus, two bases (costs and revenues both before and after diversion) have been included, with the former being based on detailed grain movement data and the latter an estimate based on the rail share increasing from the 68 percent occurring in 1979 to 85 percent solely due to the single car rate reduction. The figures shown for the two bases can be treated as a range, although the anticipated results should be closer to those indicated by the "after diversion" base case.

Table 1 presents transport system revenues and costs for Alternatives 2 and 2A summarized on a statewide basis. Under these alternatives, subterminals would supplement existing grain public warehouses. (The "A" alternative reflects variable rather than fixed handling charges.) The table shows that resulting charges to growers would be greater than those occurring under single car service. The collective cost to carriers and elevator operators would be slightly greater. Hence the finding that adding subterminals to public warehouses makes little economic sense.

TABLE 1

TRANSPORT SYSTEM REVENUES AND COSTS
(ALTERNATIVES 2 and 2A)

	Timing	Base	Alt. 2	Diff.	Alt. 2A	Diff.
Revenues/ Charges	before	$133.4	$139.2	$ + 5.9	$138.5	$ + 5.1
	after	128.6		+10.7		+ 9.9
Cost to Carriers	before	119.1	115.3	- 3.8	115.3	- 3.8
	after	111.9		+ 3.4		+ 3.4
Profit to Carriers	before	14.3	24.1	+ 9.8	23.2	+ 8.9
	after	16.7		+ 7.4		+ 6.5

All figures are in millions.
Includes subterminal and residual (truck and single car rail) traffic.

Table 2 presents transport system revenues and costs for Alternatives 3 and 3A again summarized on a statewide basis. Under these alternatives, subterminals replace grain public warehouses. In this case the resulting charges to growers drop by roughly $7 to $12 million. Profitability to the carriers increases by 30 to 60 percent. Hence the finding that subterminals are economically feasible on a statewide basis and can lead to lower transport charges and rates.[1/]

[1/] Irrespective of whether single car rates before or after December 1, 1980 are used as the basis for comparison. However, it must be recognized that, in making the rate reduction, the BN is not being altruistic, but rather seeking to eliminate motor carrier competition and that once competition has been appreciably reduced, single car rates could eventually be increased back to roughly previous levels (excluding general rate increases to counter the effects of inflation).

TABLE 2

TRANSPORT SYSTEM REVENUES AND COSTS
(ALTERNATIVES 3 and 3A)

	Timing	Base	Alt. 3	Diff.	Alt. 3A	Diff.
Revenues/Charges	before	$133.4	$121.7	$ -11.7	$ 120.8	$ -12.6
	after	128.6		- 6.9		- 7.8
Cost to Carriers	before	119.1	98.9	-20.2	98.9	-20.2
	after	111.9		-13.0		-13.0
Profit to Carriers	before	14.3	22.8	+ 8.5	21.9	+ 7.6
	after	16.7		+ 6.1		+ 5.2

All figures are in millions.
Includes subterminal and residual (truck and single car rail) traffic.

Table 3 presents approximate transport system revenues and costs for a system of 40 to 50 quasi-subterminals, or existing grain public warehouses expanded to be able to handle 26-car units. The table indicates that the resulting charges to growers will be roughly equal to those occurring at the present time under single car service, even though the collective cost to carriers and elevator operators would go down somewhat. In this case, amortization of the capital cost to public warehouses incurred in adding track and making other improvements

TABLE 3

TRANSPORT SYSTEM REVENUES AND COSTS
(Larger Elevators Expanded to Handle 26-Car Units)

	Timing	Base	Quasi-Sub.	Diff.	Full Sub	Diff.
Revenues/Charges	before	$133.4	$129.2	$ - 4.2	$121.7	$ -7.5
	after	128.6		+ 0.6		
Cost to Carriers	before	119.1	105.7	-13.4	98.9	-6.8
	after	111.9		- 6.2		
Profit to Carriers	before	14.3	23.5	+ 9.2	22.8	-0.7
	after	16.7		+ 6.8		

All figures are in millions.
Figures shown for the full subterminal based on Alternative 3.

to achieve rapid loadout capability offsets the 12 cents/bushel savings in the unit rail rate. The cost reduction stems from the unit cost savings made possible to the railroads from the 26-car multiple car rate, as compared with single car service. Also shown are the comparable results for a full subterminal (Alternative 3). The computations indicate that only full subterminals produce savings in transport charges which at least potentially can be passed back to the grower. Subterminals also produce further cost reductions for the carriers. The computations also indicate that the 26-car service is somewhat more profitable than unit train service; while this result may seem unusual, it is probably a consequence of the generalized costing procedure utilized. It is understandable by remembering that the BN is not likely to offer a volume rate unless it will result in a handsome profit to that railroad.

Tables 4 and 5 provide information on unit revenues and costs at the subterminal level. As would be expected, the reduction in unit revenues or charges and costs for subterminal tributary areas (as a whole) range considerably by location, with the greatest benefits occurring at subterminals having the highest throughput.

TABLE 4

SUBTERMINAL REVENUES AND COSTS
(ALTERNATIVE 3)

Sub-terminal Location	Thru-put (m.bu.)	Unit Revenues/Charges ($/bu.)			Unit Costs ($/bu.)			Change in Profit-ability
		Base	Alt.3	Diff.	Base	Alt.3	Diff.	
01	5.59	1.29	1.25	- 0.04	1.18	0.99	- 0.19	+ 0.15
09	4.40	1.51	1.37	- 0.14	1.26	1.09	- 0.17	+ 0.02
20	3.23	1.16	1.09	- 0.07	1.08	0.98	- 0.10	+ 0.02
24	4.96	1.18	1.05	- 0.13	1.13	0.94	- 0.19	+ 0.06
26	16.59	1.09	0.97	- 0.12	1.07	0.84	- 0.23	+ 0.10
28	17.05	1.13	1.03	- 0.10	0.99	0.82	- 0.17	+ 0.07
32	6.26	1.33	1.20	- 0.13	1.14	0.96	- 0.18	+ 0.05
37	16.16	1.41	1.27	- 0.14	1.19	0.97	- 0.22	+ 0.08
40	8.85	1.39	1.29	- 0.10	1.17	1.00	- 0.17	+ 0.06
52	25.57	1.09	0.98	- 0.11	0.98	0.78	- 0.20	+ 0.06
Total/ Avg.	109.90	1.21	1.11	- 0.11	1.08	0.90	- 0.19	+ 0.08

TABLE 5

SUBTERMINAL REVENUES AND COSTS
(ALTERNATIVE 3A)

Sub-terminal Location	Thru-put (m.bu.)	Unit Revenues/Charges ($/bu.)			Unit Costs ($/bu.)			Change i Profit-ability
		Base	Alt.3A	Diff.	Base	Alt.3A	Diff.	
01	5.59	1.29	1.27	- .02	1.18	0.99	- .19	+ .18
09	4.40	1.51	1.41	- .10	1.26	1.09	- .17	+ .07
20	3.23	1.16	1.16	-	1.08	0.98	- .10	+ .09
24	4.96	1.18	1.08	- .10	1.13	0.94	- .19	+ .09
26	16.59	1.09	0.95	- .14	1.07	0.85	- .22	+ .08
28	17.05	1.13	1.01	- .12	0.99	0.82	- .17	+ .05
32	6.26	1.33	1.22	- .11	1.14	0.96	- .18	+ .06
37	16.16	1.41	1.25	- .16	1.19	0.97	- .22	+ .06
40	8.85	1.39	1.30	- .09	1.17	1.00	- .17	+ .07
52	25.57	1.09	0.95	- .14	0.98	0.78	- .20	+ .06
Total/ Avg.	109.90	1.21	1.10	- .11	1.08	0.90	- .19	+ .07

In addition, considerable variation exists within each subterminal tributary area. A further test was made to determine whether some savings was possible for most, if not all grain-producing units tributary to a subterminal. It was reasoned that a grower would utilize a grain subterminal only if the transport charges were less (or the price received for grain was higher by the same amount) than that which would occur from continued utilization of a public warehouse. Nine of the ten subterminal tributary areas produced potential savings for virtually all grain-producing units. Subterminal location #20 (in southwestern Montana) failed this test rather substantially, especially under the scenario requiring the facility to be self-supporting. Not only did this subterminal have the least volume of the ten, but the presence of the Interstate system and the relative proximity to Lewiston, ID provide a greater range of transportation alternatives than are available elsewhere. Consequently, the further finding that nine of the ten subterminals, four of which could be further subdivided, appear to be feasible either as part of a system of subterminals or on a stand alone basis.

Table 6 shows the potential benefits of subterminals to growers, provided that the savings are passed back. While the overall 14.2 or 15.3 cents per bushel savings for the subterminal user may not seem that large, this savings is in addition to the 14 cents per bushel already provided through the reduction in single car rates on December 1, 1980. Also shown is the overall unit savings of 10.6 or 11.5 cents per bushel which includes both subterminal and residual (truck and single-car rail) traffic.

TABLE 6

POTENTIAL BENEFITS TO GRAIN GROWERS (ALTERNATIVES 3 and 3A)

	ALT. 3		ALT. 3A	
	Unit Charge	Savings	Unit Charge	Savings
Present	$ 1.214/bu.	-	$ 1.214/bu.	-
Subterminal User	1.072/bu.	14.2¢/bu.	1.061/bu.	15.3¢/bu.
Average User*	1.108/bu.	10.6¢/bu.	1.099/bu.	11.5¢/bu.

* Includes both subterminal and residual (truck and single-car rail) traffic.

Table 7 summarizes the overall impact upon railroads, which in this case is the BN. Two trends are apparent -- the diversion of truck to rail and the costs savings from substituting unit trains for single-car rail service. In short, BN stands to substantially increase the profitability of its grain transport operations in Montana.[1/] Obviously, the volume rates introduced on December 1, 1980 are designed for that purpose.

TABLE 7

IMPACT UPON RAILROADS

	Revenues	Costs	Profit	Return
Present	$ 74.4	$ 60.7	$ 13.7	23%
With Subterminals	86.2	65.2	21.0	32%
Change	+ 11.8	+ 4.5	+ 7.3	

All figures are in millions
Includes subterminal and residual (truck and single-car rail) traffic.
Rail share increases from 74.6 to 102.4 million bushels.

Table 8 summarizes the overall impact upon motor carriers. Although revenues and costs go down by nearly one-half, the bushels handled go up substantially, provided that the subterminals become involved in the grain collection business as previously discussed. Obviously, the average haul distance decreases significantly in the change of function. Table 8 also indicates the present unprofitability of grain haulage by truck.

[1/] The figures shown do not include the cost savings stemming from (1) cutbacks in the frequency of local freights, (2) decreased size of the car fleet, and (3) elimination of branchlines no longer required. Thus, potential savings to the BN are even higher than those indicated.

By going to a collector-type operation rather than competing head-on with unit train service, profitability of trucking operations is expected to be improved.[1/]

TABLE 8

IMPACT UPON MOTOR CARRIERS (ALTERNATIVES 3 and 3A)

	Revenues	Costs	Profit	Return
Present	$ 28.6	$ 29.8	$ - 1.3	- 4%
With Subterminals	15.4	15.9	- 0.4	- 2.5%
Change	-13.2	-13.9	- 0.9	

All figures are in millions.

Includes subterminal and residual (truck and single-car rail) traffic.

Motor carrier function changes; line haul transport decreases from 35.2 to 7.3 million bushels while collector-type services are projected at 60.1 million bushels.

Table 9 shows the impact upon river terminals and barge operators. Only a portion of the residual Montana grain traffic would continue to move via Snake and Columbia river ports. Table 10 shows the corresponding impact upon farm trucks both with and without the provision of collector-type services.

[1/] Motor carrier profitability in a line haul type operation performed by owner/operators is difficult to pin down, as it depends heavily on the amount of investment in the equipment being utilized, the efficiency of the operation particularly in terms of backhaul utilization, and the amount taken out for salary and/or profit under the proposed collector-type operation, a competitive environment has been assumed with subterminals contracting out trucking operations with costs essentially equalling revenues.

TABLE 9

IMPACT UPON RIVER TERMINALS AND BARGE OPERATORS

	Revenues/Costs
Present	$ 5.1
With Subterminals (Residual only)	0.9
Change	- 4.2

All figures are in millions
Barge traffic decreases from 26.8 to 4.0 million bushels.

TABLE 10

IMPACT UPON FARM TRUCKS
(ALTERNATIVES 3 and 3A)

	Costs*	Costs**
Present	$ 7.3	$ 7.3
With Subterminals	4.0	16.1
Change	- 3.3	+ 8.8

All figures are in millions.

Includes subterminal and residual (truck and single-car rail) traffic.

* Assumes subterminals provide grain haulage for growers located more than 35 miles from subterminal.

** Assumes subterminals do not provide grain haulage service.

Considerable concern has been expressed over the impact which subterminals may have on local highway systems. This concern arises from the damage already done to certain Montana highways by grain trucks and the fear that similar destruction could take place were such traffic shifted to other highways. With subterminals, farm and grain truck vehicle miles of travel are expected to decrease from 27.1 million miles (17.6 million miles within Montana) to 6.7 or 11.1 million miles annually, depending upon whether subterminals offer a grain assembly service or not. Such reductions are expected to occur primarily on the principal grain hauling routes, such as Interstate 90, U. S. 2 and Montana 200. Some increase in truck volumes will occur on segments in the general vicinity of GSTs.

Changes in truck volumes per se do not directly reflect impacts on the pavement and substructure. Consequently, both present truck volumes and the estimated change in farm and grain truck usage have been converted to equivalent annual load applications, which places the impact of vehicles having different weights and wheel and axle configurations on a uniform basis. The total loadings anticipated under Alternatives 3 and 3A were then compared with those occurring under the base case (on a segment-by-segment basis) to determine absolute and relative impact. Table 11 shows the estimated impact of subterminal traffic as a function of highway jurisdiction. Loadings on Interstate and U. S. highway segments would decrease by 13 and 10 percent, respectively, and remain approximately constant on other primary and secondary highways. Loadings on over half of the highway segments would not change appreciably from current levels. Overall, average loadings would decrease by 11 percent.

TABLE 11

ESTIMATED SYSTEMWIDE IMPACT OF SUBTERMINAL-GENERATED TRAFFIC UPON THE STATE HIGHWAY SYSTEM

Percent Change in Equivalent Annual Load Applications
(Percent of Highway Segments)

	Decrease -- Annual Pavement Loadings -- Increase				
	-30% and greater	-10 to -30%	-10 to +10%	+10 to +30%	30% and greater
Interstate Highways	7	18	73	3	0
U.S. Routes	14	13	56	13	3
MT Routes	8	7	47	17	21
County/Local Roads	5	0	47	34	12

While truck volumes and loadings will increase in the vicinity of subterminals, these effects are localized and do not appear large enough to significantly reduce present levels of service or greatly hasten pavement deterioration. It would be inappropriate to identify the location of these segments, since this study is concerned with the overall feasibility of subterminals and not with the location of specific facilities and attendant local impacts. While it appears that loadings would increase on lower jurisdiction roads, much of the apparent change stems from the lack of truck traffic presently on these facilities, which makes any relative increase in loadings seem more significant than it really is. It is also necessary to place the whole subject of truck volumes in perspective -- that the volumes occurring are a function of the truck and rail modal shares, which in turn are set by comparative rates. It is well to remember that in the past, government has not sought to control the usage of the highway system for transporting grain, even though this action has led to the severe deterioration of at least several highways in Montana and tacit acceptance of a portion of the grain transport cost (infrastructure) by the public sector. Subterminals lead to heightened usage of the rail system, which over the long term removes grain trucks from the highway stem. Further reducing single carload rates to increase rail usage would accomplish the same thing, although this is unlikely given the absence of any economic incentive to the BN.

Conclusions

First of all, there is little doubt that grain subterminals are coming. BN introduction of volume rates and industry response thereto through (1) fairly extensive utilization of the 26-car rate during the first half of 1981, even though this often required cooperative marketing by several elevators located in the same general area or inconvenient loading/switching operations, (2) some 40 requests on file with the BN for engineering plans and cost estimates for expanding tracks at existing grain public warehouses, and (3) construction underway or about to begin for grain subterminal-type facilities located at Rudyard, Plentywood, and Mocassin taken together vividly demonstrates this. Montana no longer has the choice of retaining the previous grain collector and marketing system, or even if it had, would it be in Montana's interest to do so. Grain subterminals will be built primarily because the investors involved are convinced that such facilities are more profitable than the country elevators being replaced. Ironically, the main reason why construction of such facilities have not proceeded faster is the high cost of investment capital at the present time and the long lead time needed to secure property, plan and design the subterminal, and obtain sidetrack construction through the BN. Thus, for the past year, Montana has had a reprieve which gives every appearance of ending in the near future.

Second, if the changeover is left entirely up to private enterprise, then a "mixed" system of a few strategically-located subterminals, a number of "expanded" grain public warehouses, and a reduced number of conventional country elevators will eventually evolve, with the former serving those areas having the greatest density of grain production and the latter areas having sparser production. The underlying motivation in subterminal construction will not be one of serving the grower better or offering a higher price for his wheat, or even strengthening the grain collection system in Montana, but rather capitalizing upon the newly created opportunity for substantial profits through the economies of scale achievable with subterminals and unit trains. In proposing the expansion of existing elevators, the rationale is that of (1) expanding existing plant infrastructure just enough so as to be able to take advantage of the 26-car multiple rate, (2) getting a jump on, or at least keeping up with, nearby competitors, and (3) maintaining the grain collection and marketing business as it has traditionally been conducted. Here again, the motivations center around retaining the traditional modus operandi and hopefully enhancing the profitability of the operation in the face of what is perceived to be a potential takeover and domination by the grain companies or outsiders. In all of this, there is no guarantee that the grower will benefit to any significant degree through either the construction of subterminals or expanded public warehouses, unless competition can be maintained at least in the principal grain-producing areas of Montana.

Third, long-term success as a supplier to world markets depends partly upon the quality of the product being offered and partly upon a state's efficiency in assembling and marketing grain. There is no question that Montana produces some of the finest wheat grown in the United States. However, its delivery system is lacking. Montana today is appreciably behind the other principal wheat-producing states in developing modern grain collection facilities and supporting unit train service. Obviously the state can play catch-up ball. This in itself would not necessarily improve Montana's capabilities vis-a-vis those of competing states, which a likewise are continuing to modernize their grain transport systems. Montana must not replicate what other states are doing, but rather invest in the most modern technology available today for collecting and delivering grain.

Increasing grain exports to Pacific-rim counties and the economies of scale afforded by larger vessels are simultaneously forcing changes in port capabilities. New grain "bulkers" having capacities upwards of one hundred thousand tons are entering revenue service. Existing ports do not have draughts sufficient to handle these vessels. Improvements to existing ports are severely constrained by the cost and environmental impacts of dredging operations. A more practical alternative is to develop a new deepwater port to handle bulk commodities such as grain and coal. Unlike present ports which offer a variety of services, a new port will be a highly automated, specialized bulk commodities transfer facility; storage, blending, inspection, certification, and other processing-type operations associated with present-day terminal elevators will of necessity have to be relocated to strategic inland points. Subterminal loadout operations, unit train movements, and vessel loading will then become highly integrated. Montana must design and build its subterminal facilities as an integral component of an evolving future grain delivery system and not simply as a reaction to present day conditions.

A strong competitive position can only be maintained through investing in modern, high-volume, fully automated subterminal facilities. Modifying existing elevators (or jury-rigging) solely to meet today's railroad-imposed conditions for obtaining volume rates represents a rather short-lived capital investment subject to obsolescence as the conditions surrounding volume rates (e.g., the number of cars and the loading time) are tightened. Such investments simply match the technology already employed by other states and do nothing to improve Montana's competitive position. Maximizing the return to the State can only be achieved by making the collection and delivery systems as efficient as possible.

Fourth, the changeover to subterminals or expanded public warehouses could spawn some problems which either need to be addressed and solved now, or mechanisms established to prevent possible future abuses. The five areas of concern are identified below along with a discussion of appropriate ameliorating actions:

1. Lack of competition in transporting grain via rail. This problem which can lead to monopolistic abuses such as high rates, poor service, equipment unavailability, etc. is not a new one. While truck and truck/barge rates do provide an upper bound on rail rates, a possibly more effective arrangement would be to shift over to contract rates either negotiated directly by the subterminals or by the state as a whole. The key lies in operations which achieve maximum efficiency in the use of the railroad facilities as a means of keeping rate structures below those of competing modes.

2. Lack of competition in marketing grain. The success of subterminals depends upon achieving high throughputs; any system capitalizing upon transport economies of scale inevitably reduces the alternatives available to growers for marketing grain. Competition tends to be between like facilities, rather than between facilities having varying capabilities vis-a-vis volume rates. (In the latter case, the more efficient and larger subterminals tend to drive the smaller elevators out of business.) The key is establishing a system of subterminals, rather than letting private enterprise (in effect) subdivide the grain producing areas into a more-or-less exclusive set of tributary areas. However, it should be recognized that the density of grain production in Montana is probably not great enough to ensure competing subterminals except in the Golden Triangle and the Northeastern portion of the State. Public encouragement and financial support may be requisite to ensure that a system of subterminals offering some degree of choice to growers comes into being.

3. Locational discrimination. As the number of elevators becomes fewer, average farm-to-elevator distances increase. This can adversely affect a substantial number of growers simply because of decisions made in siting subterminals. The way around this problem is a sharing of grain collection costs to minimize the economic hardship which might fall on some growers and not on others. A variety of options exist for accomplishing this built around the subterminal picking up all or a portion of the grain collection costs either for all growers or those located beyond a threshold distance, with the latter being based on distance to the subterminal or the change in distance between the country elevator and the subterminal.

4. Passing on transport cost savings. While the numbers presented in the previous section indicate that subterminals do result in transport cost savings, there is no guarantee that such savings, or a portion thereof, will even reach the growers. Much depends upon who owns the subterminals. If owned by cooperatives or by local governments (either directly or through regional authorities), then mechanisms can be provided for passing the savings back to the growers.

5. Financing needed highway improvements in the vicinity of subterminals. Overall, the impact on highways from grain and farm truck movements should decrease as a consequence of the conversion to grain subterminals. The concern arises not from the lessening of volumes (or load applications) on roads carrying substantial grain traffic (and where the structural damage may already have been done), but rather from localized problems stemming from increased volumes in the vicinity of subterminals. Some improvements may be required for which capital funds will be required. While it can be argued that the reduction in volumes elsewhere on the system permits the reapplication of already existing capital funds, a more direct approach might be to institute a throughput charge (e.g., one cent per bushel) on subterminals, the proceeds of which could be used to finance pavement strengthening and resurfacing on routes principally used by trucks destined to subterminals.

Finally, one must remember that the type of grain collection system to be instituted in Montana will come about as much through positive action in controlling the development of subterminals as through public indecision and inaction. The basic choice is whether Montana should adopt a laissez faire approach towards impending change or to seek a guide subterminal development to (1) achieve an efficient system, yet at the same time maintain adequate competition to prevent excessive profiteering, (2) keep the collection and marketing of Montana grain at least partly in local hands, rather than let the major grain companies and other outside interests totally dominate, and (3) prevent the excesses that could occur during the transition period. The main issues at stake are the degree to which (1) power is concentrated and competition lost in the marketing of grain, and (2) the savings resulting from a shift to volume shipments are returned to the state (and more specifically to the grain growers).

Alternatives for Montana

In the end, the alternatives boil down to two different course of action: (1) leave the implementation of subterminals (or expanded grain public warehouses) largely or entirely up to private enterprise, or (2) initiate some form of governmental intervention and involvement along with private enterprise. The latter should focus on subterminals and could involve any of the following possibilities:

1. Acting in a catalyst and informational role by encouraging present public warehouses and/or cooperatives to merge and form subterminals, but otherwise remain aloof.
2. The above, but with planning and financing capabilities as well. Under this option, the initiative would be left to grain growers and/or warehouse operators with preference being given to grower cooperatives or consolidations of locally-owned public warehouses. Resulting subterminals would be privately owned and operated.
3. The above, but that implementation would be through specially-formed, multi-county, quasi-governmental organizations which would then bond and build subterminal facilities, which would then be leased back to private operators.
4. State ownership and operation of subterminals.

In deciding among the preceding courses of action, the State must be guided by a clear recognition of just where its short- and long-term interests lie, which include (among others):

1. Strengthening Montana's position in worldwide grain markets.
2. Maintaining a balance between the efficiency of large-scale terminal-type operations and the price and service protection afforded by competition in the collection and marketing of grain.
3. Developing effective means to counter monopolistic tendencies detrimental to the State in the collection, marketing and transportation of grain.

4. Seeking an equitable distribution of transport cost savings resulting from subterminal and unit train operations (e.g., at least a portion of the savings is passed back to the growers).

5. Keeping the collection and marketing of Montana grain in local hands, if at all possible.

6. Making the transition to subterminals as painless as possible.

RCAI believes that if the preceding objectives are to be achieved, the State of Montana must become actively involved in the process of modernizing the State's grain collection and transport system. The underlying rationale for this is long-term economic development of the State. Perhaps the best way of approaching this is to create a "package" of the components including (1) a detailed plan and schedule for implementing grain subterminals (and lesser facilities, where needed), (2) contract rates with the BN, (3) financing, (4) appropriate standards and rules to regulate subterminals, (5) funding arrangements for highway improvements, (6) incentives to encourage existing country elevators and elevators to come together to construct and operate subterminals, and (7) development of a deepwater port on Puget Sound which covers the total process. For the State to do less would be to permit the very things considered objectionable to happen. At the same time, the State must not encroach upon the legitimate prerogatives of private enterprise.

One final thought. Time is short. Treating subterminals as a rainy day matter practically guarantees that control will pass to outsiders, with little or no sharing of the benefits of subterminals among Montanans. The great challenge to the agricultural community is to stop living in the past, and to plan and build for the future -- understanding fully the global and long-term implications of the decisions which are or will have to be made, either positively or by default. In a sense, Montana is like a large corporation (the product of which is grain) seeking to increase its profitability which can then be shared among the principal stockholders (i.e., the growers, the elevator operators, and the transporters). Unless internal efficiencies are increased and appropriate controls put in place, the corporation will find itself increasingly less able to compete in the market place -- the world.